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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte VADIM KONRADI, PARKER DORRIS,
MICHAEL FRANKLIN, and DAVID R. WELLAND

Appeal 2016-003599
Application 13/342,658[1]
Technology Center 2600

Before CATHERINE SHIANG, NORMAN H. BEAMER, and
JAMES W. DEJMEK, *Administrative Patent Judges*.

DEJMEK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from a Final Rejection of claims 1–20. We have jurisdiction over the pending claims under 35 U.S.C. § 6(b).

We affirm-in-part.

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[1] Appellants identify Silicon Laboratories Inc. as the real party in interest. App. Br. 3.

STATEMENT OF THE CASE

Introduction

Appellants' claimed invention is directed to controllers for capacitive touch screens. Spec. ¶ 2. According to the Specification, a capacitive touch screen is formed by a grid of rows and columns of conductors in which the rows and columns are separated by a dielectric material. Spec. ¶ 3. Possible touch positions are represented by the intersections of the rows and columns. Spec. ¶ 3. A touch is identified by detecting "small disturbances in capacitance caused by the user's finger touching the surface of the touch screen." Spec. ¶ 3. Further, according to the Specification, interference from other nearby electrical circuits/signals may also affect the detected capacitance and corrupt the touch position determination. Spec. ¶ 3.

The Specification describes the determination of a baseline capacitance by measuring capacitance at each touch position on the touch screen grid. *See* Spec. ¶¶ 36–38. According to the Specification, the baseline capacitance varies according to a scan frequency being used. Spec. ¶ 36. At start-up, a survey scan is performed to determine a baseline measurement of interference as the scan frequency varies. Spec. ¶ 36. Another type of scan—a panel scan—is used to determine one or more touch locations. Spec. ¶ 37. According to the Specification, based on the measured interference levels at different values of operational parameters (e.g., scan frequency), operational parameters (including scan frequency) are selected to perform the panel scan and improve the integrity of the touch measurement. Spec. ¶ 38.

Claim 1 is exemplary of the subject matter on appeal and is reproduced below with the disputed limitation emphasized in *italics*:

> 1. A controller for a capacitive touch screen, comprising:
>
> a touch resolve subsystem that, when activated, measures a plurality of capacitance values using a plurality of input pins; and
>
> a processor that uses said plurality of capacitance values at each of a plurality of values of a parameter to create an interference map, said interference map identifying a level of interference at each of said plurality of values of said parameter, and said values vary over an allowed range, and *to select a desired value of said parameter based on said interference map over said allowed range.*

The Examiner's Rejection

Claims 1–20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Curtis et al. (US 2011/0007028 A1; Jan. 13, 2011) ("Curtis"); Olson (US 2012/0043970 A1; Feb. 23, 2012); and Krah (US 2008/0157893 A1; July 3, 2008). Final Act. 2–15.

Issues on Appeal

1. Did the Examiner err in finding the combination of Curtis, Olson, and Krah teaches or suggests "select[ing] a desired value of said parameter based on said interference map over said allowed range," as recited in claim 1?

2. Did the Examiner err in finding the combination of Curtis, Olson, and Krah teaches or suggests selecting a desired scan frequency "based on both said level of interference and scan frequency for each of a plurality of scan frequencies," as recited in claim 4?

3. Did the Examiner err in finding the combination of Curtis, Olson, and Krah teaches or suggests a parameter comprising "a number of scan pulses per scan line," as recited in claim 6?

4. Did the Examiner err in finding the combination of Curtis, Olson, and Krah teaches or suggests a parameter indicating "whether to implement a highpass filter in said touch resolve subsystem," as recited in claim 7?

5. Did the Examiner err in finding the combination of Curtis, Olson, and Krah teaches or suggests "alternatively perform[ing] a survey scan operation and a panel scan operation during normal operation," as recited in claim 9?

ANALYSIS[2]

Claims 1–3, 8, and 10–20

Appellants contend the Examiner erred in finding Krah teaches selecting a desired value of a parameter based on the interference map over the allowed range of a parameter value. App. Br. 6–10; Reply Br. 1–5. In particular, Appellants argue Krah, as relied upon by the Examiner, "relate[s] to finding frequencies for the 'frequency hopping table', not to selecting a desired frequency over the range of frequencies of the 'frequency hopping table'." App. Br. 8. Appellants contend Krah discloses creating a frequency hopping table (i.e., a list of acceptable values), but does not disclose selecting a desired value over the range of values. App. Br. 9. Additionally, Appellants assert the Examiner fails to give weight to the word "over" as recited in the claim. Reply Br. 3. Appellants suggest the claimed invention

[2] Throughout this Decision we have considered the Appeal Brief, filed August 20, 2015 ("App. Br."); the Reply Brief, filed February 24, 2016 ("Reply Br."); the Examiner's Answer, mailed on December 24, 2015 ("Ans."); and the Final Office Action ("Final Act."), mailed on March 17, 2015, from which this Appeal is taken.

considers the whole range of values before selecting the desired value. Reply Br. 3–4. Appellants assert the claimed invention can give a bias or preference for one parameter setting as compared to another setting in the case where the levels of interference are similar. Reply Br. 4.

As an initial matter, we note claim 1 does not require the processor to give preference to one parameter setting over another when the measured interference levels are similar. Rather, claim 1 merely recites, inter alia, "select[ing] a desired value of said parameter based on said interference map over said allowed range." Thus, Appellants' arguments are not commensurate with the scope of claim 1 and, therefore, do not persuade us of error in the Examiner's rejection. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (limitations not appearing in the claims cannot be relied upon for patentability).

Further, we disagree with Appellants' discussion of Figure 13 of Krah. Figure 13 of Krah is illustrative and is reproduced below:

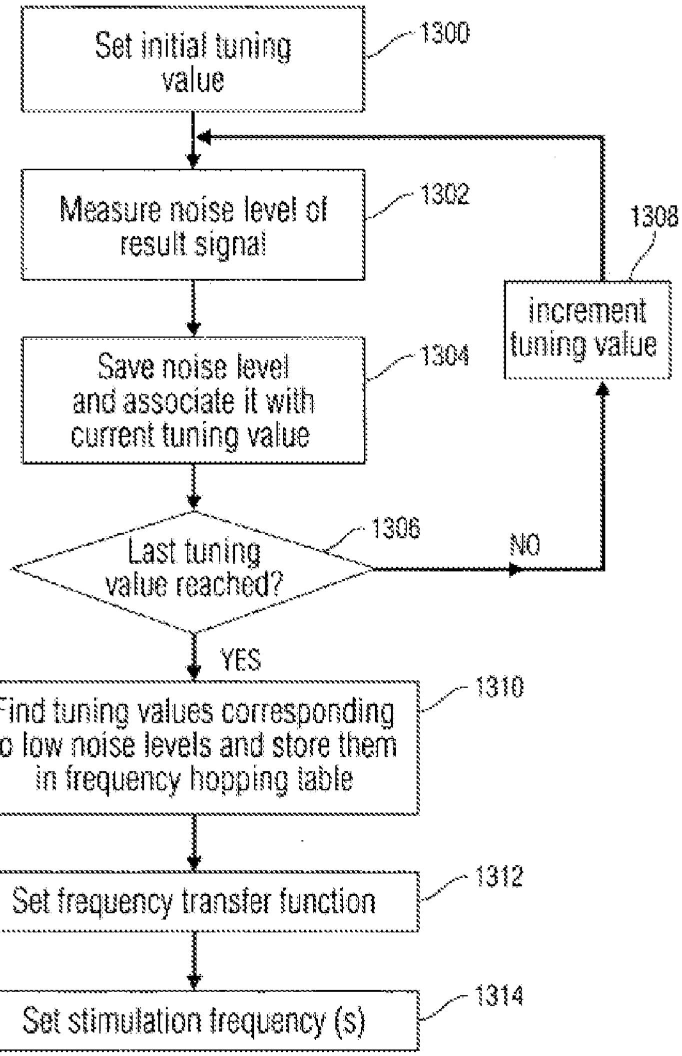

Fig. 13

Figure 13 of Krah is a flow chart for controlling the stimulation frequency to avoid noise. Krah ¶ 28. As shown, the noise level of the result signal is measured and saved (items 1302 and 1304) for a tuning value. These steps are repeated until the noise level has been measured and saved for the last tuning value (i.e., the end of the tuning range) (*see* items 1306 and 1308). *See* Krah ¶¶ 148–153. The frequency is not set (i.e., selected) until the noise levels have been measured across the range of tuning values (item 1314).

Additionally, we agree with the Examiner that "selecting a frequency from an acceptable range of values corresponds to [the] claimed limitation with respect to selecting a desired value." Ans. 2–3 (emphasis omitted).

For the reasons discussed *supra*, we are unpersuaded of Examiner error. Accordingly, we sustain the Examiner's rejection of claim 1. For similar reasons, we also sustain the Examiner's rejection of independent claims 11 and 18, which recite similar limitations and for which Appellants advance similar arguments. *See* App. Br. 18–19. Additionally, we sustain the Examiner's rejection of claims 2, 3, 8–10, 12–17, 19, and 20, which depend therefrom and were not argued separately. *See* App. Br. 10, 18–19.

Claims 4 and 5

Claim 4 recites, in relevant part, "wherein said processor uses said interference map to select said desired scan frequency based on both said level of interference and scan frequency for each of a plurality of scan frequencies." Appellants assert that Olson, as relied upon by the Examiner, discloses adjusting drive parameters (which may include a switched capacitor frequency) to achieve a scan output within a desired window. App. Br. 12 (citing Olson ¶¶ 26, 27, and 31). Thus, Appellants argue, Olson fails to teach selecting a parameter (e.g., scan frequency) based on both the scan output and the parameter itself. App. Br. 12.

In response, the Examiner explains Figure 6 of Olson teaches a tuning parameter which is adjusted by increasing or decreasing frequency based on a comparison with a predetermined plurality of frequency ranges. Ans. 3–4. Figure 6 of Olson is illustrative and is reproduced below.

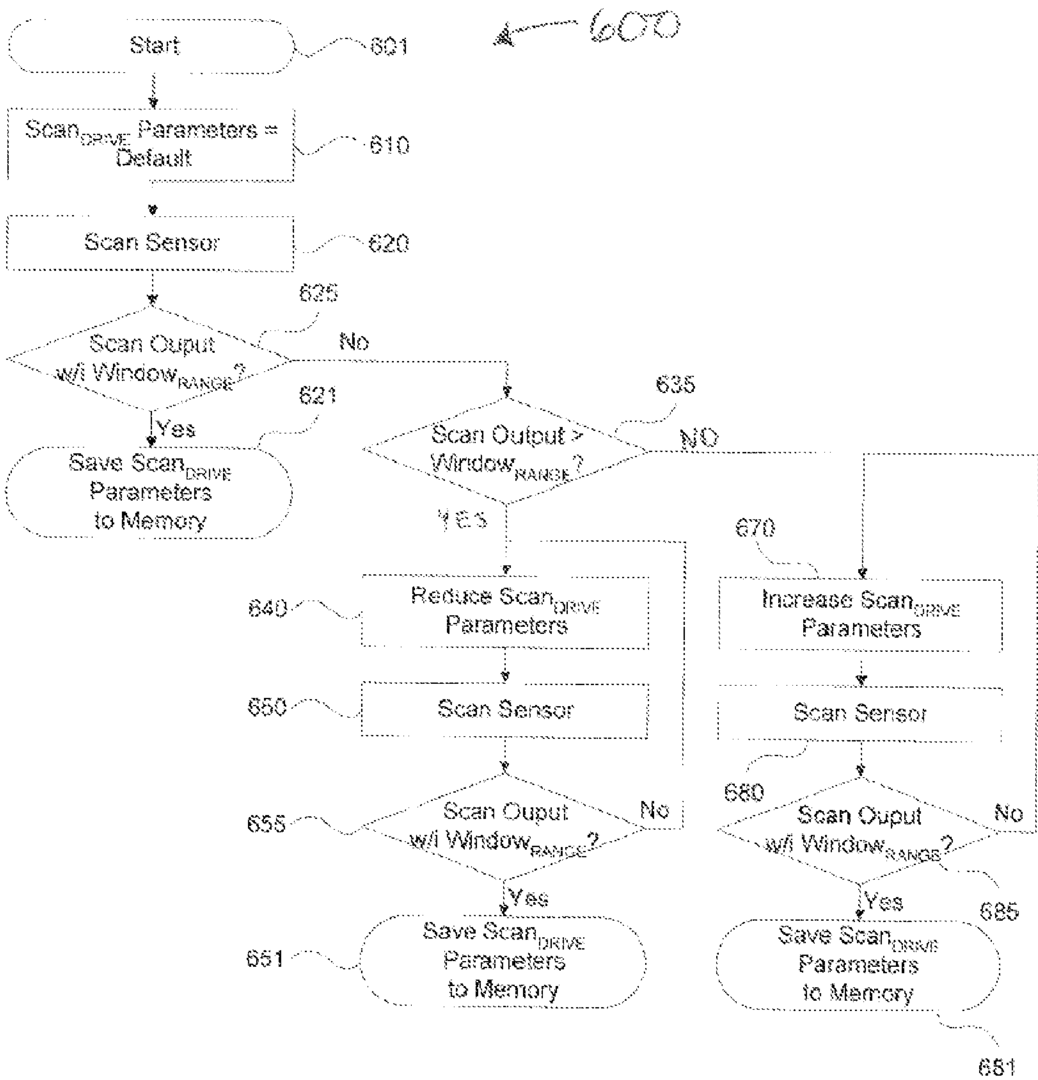

FIGURE 6

Figure 6 of Olson illustrates a flowchart for automatically setting range parameters in a capacitive sensing system. Olson ¶ 13. As shown, $Scan_{DRIVE}$ parameters are reduced or increased (items 640 and 670) when the Scan Output is outside of the $Window_{RANGE}$ (items 635, 655, and 685). If the Scan Output is within the $Window_{RANGE}$, the parameters are saved and the process stops (items 655, 685, 651, and 681).

The Examiner finds "by adjusting the tuning parameter range it is obvious to one of ordinary skill in the art that **Olson** is searching for a particular range to select from, which corresponds to a desired scan frequency based on level of interference and/or noise and scan frequency for each plurality of frequencies." Ans. 4.

We agree with Appellants that Olson teaches adjusting the parameter (e.g., frequency) until a Scan Output is within a desired window. Thus, the selection of the parameter (e.g., frequency) in Olson is based on the measured noise level (i.e., Scan Output), without regard for the value of the parameter (e.g., frequency) itself.

Accordingly, we do not sustain the Examiner's rejection of claim 4 or that of claim 5, which depends therefrom.

Claim 6

Claim 6 recites the "parameter comprises a number of scan pulses per scan line."

In rejecting claim 6, the Examiner relies on Curtis as disclosing this limitation. Final Act. 6 (citing Curtis ¶ 29, Figs. 1 and 2). In particular, the Examiner finds Curtis discloses conductive elements directly connected to a port which may provide an interface to a touch controller. Final Act. 6. The Examiner finds the conductive elements of Curtis teach the claims scan lines. Final Act. 6.

Appellants argue:

> Curtis does not provide scan pulses, but uses a different system. Curtis measures a change in capacitance between crossing conductors by measuring the frequency deviation of a relaxation oscillator. Curtis' conductors are not inputs and outputs but

> rather two terminals of capacitors whose capacitance changes in the presence of a touch.

App. Br. 14.

In response, the Examiner repeats the findings from the Final Action and states "it is well known in the art to a person of ordinary skills that the touch controller provides the on/off signal for each scan line which are scan pulses." Ans. 4.

We find Appellants' argument persuasive of Examiner error. Curtis discloses a capacitive touch system wherein touches are detected by measuring deviations of a frequency using a relaxation oscillator to drive an oscillating signal onto the conductive elements. Curtis ¶¶ 4, 6. Curtis' system is different from Appellants' claimed system for detecting touch on a touch panel display. Further, we find the Examiner has not provided sufficient evidence or technical reasoning to support the finding that Curtis teaches or suggests the "parameter comprises a number of scan pulses per scan line," as recited in claim 6.

Accordingly, we do not sustain the Examiner's rejection of claim 6.

Claim 7

Appellants contest the Examiner's finding that Krah teaches a parameter that indicates whether to implement a high pass filter in the touch resolve subsystem, as required by claim 7. App. Br. 15–16. Appellants contend Krah merely discloses changing the cutoff frequency of a high pass filter, but that the identified filter is always present in Krah's panel and is not selectable. App. Br. 16 (citing Krah ¶ 145, Fig. 5).

We agree with Appellants. The sections of Krah identified by the Examiner disclose the resistive and capacitive properties of the layers of touch sensitive panel. *See* Krah ¶¶ 98–105, 145, Figs. 5 and 11. Figure 5 of Krah illustrates the resistive and capacitive elements and the associated text of Krah describes the arrangement as being known low pass and high pass configurations. Krah ¶ 102. The disclosed high pass filter is a product of the properties of the layers of the panel and, C509 (*see* Krah, Fig. 5), which forms the high pass filter, is the capacitance that is caused by the interactions of the wires in the panel. Krah ¶ 101. Thus, we agree with Appellants that this high pass filter is hard-wired into the touch panel display and is not selectable by a parameter.

Accordingly, we do not sustain the Examiner's rejection of claim 7.

Claim 9

Appellants contend none of the references (Curtis, Olson, or Krah) discloses performing both panel scans and survey scans. App. Br. 16–18. Appellants direct attention to the paragraph 29 of the Specification as reciting:

> MCU 500 uses the survey scan instructions to determine the presence of signal interference in the touch screen and to selectively change a parameter that is used to perform the panel scan. MCU 500 uses the panel scan instructions to locate the position of one or more fingers on the touch screen at a selected value of the parameter.

App. Br. 17. Appellants assert that Figure 8 of Curtis illustrates a flow chart of a method to detect a touch on a touch sensor. App. Br. 17–18. Appellants argue this flow chart refers only to panel scan operations and not survey scan operations. App. Br. 17–18.

In response, the Examiner finds Curtis discloses both panel scans and noise frequency scans. Ans. 5 (citing Curtis ¶¶ 64–68). The Examiner finds, particularly in light of paragraph 29 of Appellants' Specification, Curtis' noise frequency scans correspond to the claimed survey scan operation. Ans. 5. Appellants do not persuasively rebut the Examiner's findings.

Further, as shown in Figure 8 of Curtis, Curtis teaches updating the running baseline average when no touch has been detected and using the updated baseline average in subsequent element scans to detect a touch on the touch panel. *See* Curtis ¶¶ 60–62, Fig. 8.

Accordingly, we sustain the Examiner's rejection of claim 9.

DECISION

We affirm the Examiner's decision to reject claims 1–3 and 8–20.

We reverse the Examiner's decision to reject claims 4–7.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART